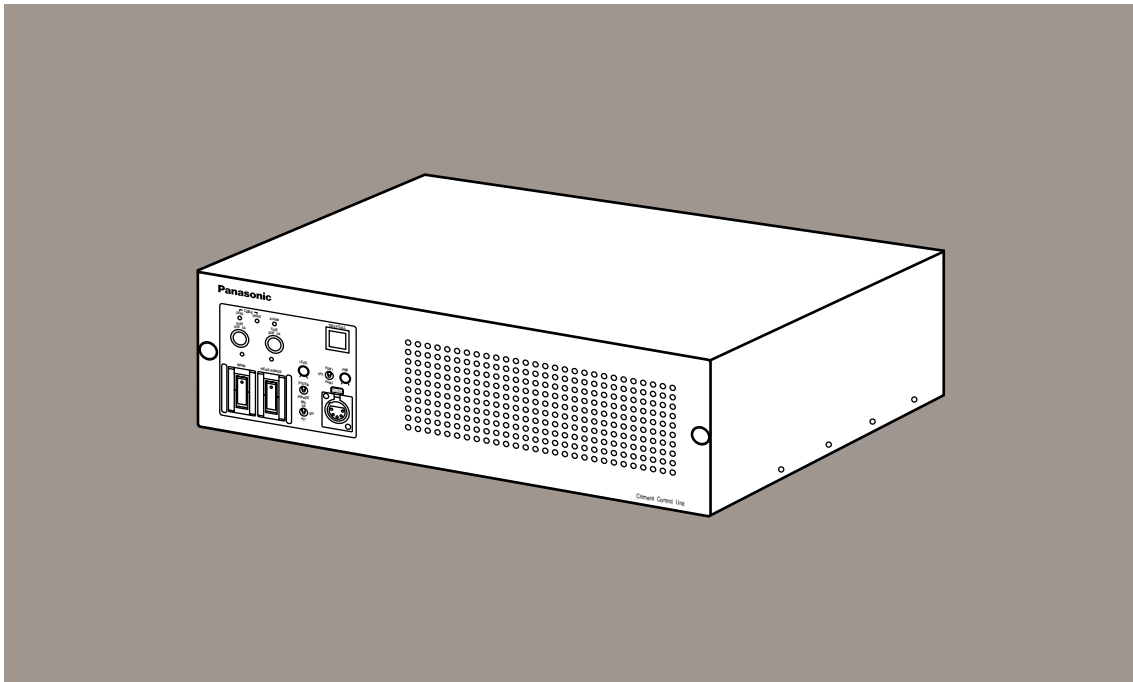


Operating Instructions



Camera Control Unit
Model AK-HCU931P



Panasonic[®]

Before attempting to connect, operate or adjust this product, please read these instructions completely.

Safety precautions

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER TO SERVICING TO QUALIFIED SERVICE PERSONNEL.		



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the appliance.

WARNING:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION:

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

For CANADA

This class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material — special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate.

FCC Note:

This device complies with Part 15 of the FCC Rules. To assure continued compliance follow the attached installation instructions and do not make any unauthorized modifications.

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION:

Invisible Laser radiation is emitted from the Optical fiber connector when this product is turned on.

Don't look into directly into the Optical fiber connector of this product.

CAUTION:

This product uses a semiconductor laser system and is a laser class 1 product complies with Radiation Performance Standards, 21CFR SUB-CHAPTER J.

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Don't make any modifications.

Don't repair by yourself.

Refer servicing to qualified personnel.

Class 1 Laser Product

 indicates safety information.

Contents

Safety precautions	2
Overview	3
Accessories	3
Operating precautions	3
Parts and their functions	4
Connections	11
External dimension drawing	13
Specifications	14

Overview

By connecting this unit to the multi-format camera (model AK-HC931P), multi-format images can be input and output. (Some of the functions are available as options.)

The unit is connected to the multi-format camera, and it is connected to the remote operation panel (ROP) and master setup unit (MSU) using dedicated multi-purpose cables (available as optional accessories).

When the designated multi-purpose cables are used, the distance between from the CCU to the ROP and MSU can be extended up to 50 meters.

Accessories

Rack-mounting adapters (×2)
Mounting screws (M4×8 mm) (×6)
BNC termination resistor (×1)
Communication connector (×1)
Power cord (×1)

Operating precautions

- **Handle the unit carefully.**

Dropping the unit or subjecting it to strong impact may cause malfunctioning and/or accidents.

- **Operate the unit within a temperature range of 32°F to 104°F (0°C to +40°C).**

Operation in locations below 32°F or above 104°F may adversely affect the internal parts.

- **Be absolutely sure to turn off the power before connecting or disconnecting the cables.**

- **Do not use the unit outdoors.**

- **Install the unit at a distance of at least 3.3 ft (1 meter) from the monitor.**

- **Maintenance**

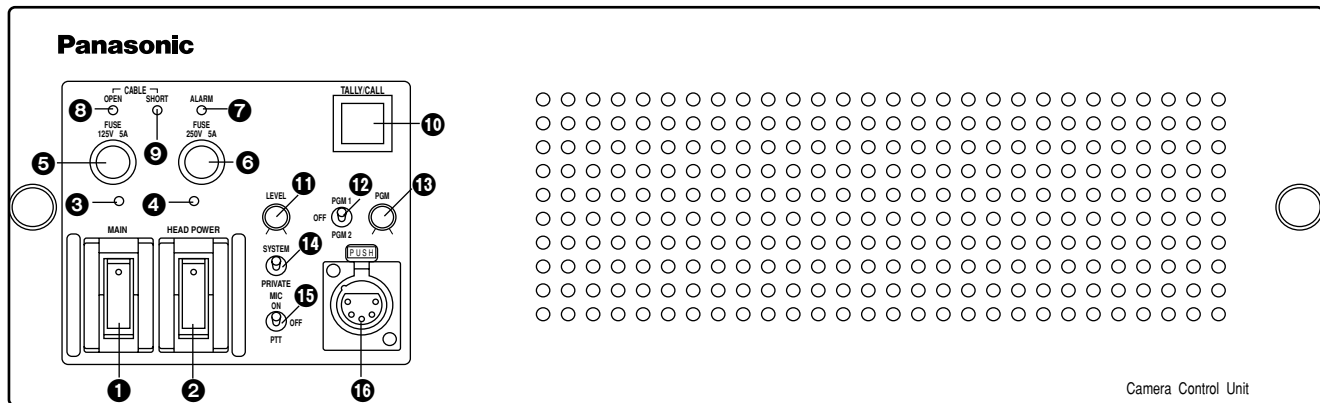
Disconnect the power plug, and wipe the unit with a dry cloth. To remove stubborn dirt, soak a cloth in diluted kitchen detergent and wring it out well, and then wipe the unit gently.

Caution

- Avoid using benzine, paint thinners or other volatile substances.
- If a chemically treated cloth is to be used, read the precautions for its use carefully.

Parts and their functions

■ Camera control unit front panel



1 CCU power switch [MAIN]

This is the power switch of the camera control unit (CCU). The CCU, ROP and other units will not operate unless this switch is set to ON.

Up: ON
Down: OFF

2 Camera power switch [HEAD POWER]

This switch supplies power to the camera. However, if the ROP has been connected, power is supplied to the camera only when this switch and the camera power switch on the TOP are both set to ON.

Up: ON
Down: OFF

3 CCU power ON LED

Lighted: The CCU power is ON.
Off: The CCU power is OFF.

4 Camera power ON LED

Lighted: This indicates that power is being supplied from the CCU to the camera.

Off: This indicates that power is not being supplied from the CCU to the camera.

Even if the camera power switch is ON, this LED remains off if no power is supplied to the camera.

This is due to one of the following reasons: ① the supply of power to the camera has been turned off by the ROP, ② one of the optical fiber cables has been disconnected or ③ something is wrong with the camera, and the power supply was turned off.

5 CCU power fuse

This is the CCU main power fuse.

6 Camera head power fuse

This is the camera head power supply fuse.

7 Alarm LED [ALARM]

Lighted: This LED indicates that the CCU's fan has stopped and that something is wrong with the power supply.

Off: Normal

If the LED remains lighted, turn off the main power and have the unit repaired.

8 Camera cable open alarm LED [CABLE / OPEN]

Lighted: The cable between the CCU and camera has been disconnected.

Off: Normal

9 Camera cable short-circuit alarm LED [CABLE / SHORT]

Lighted: The cable between the CCU and the camera has short-circuited.

Off: Normal

10 TALLY indicator/CALL switch [TALLY/CALL]

This indicator lights when the R/G tally signal is input. It is also a CALL switch for calling the camera, ROP and MSU.

11 INCOM volume control [LEVEL]

This is used to adjust the standby INCOM volume.

12 INCOM PGM selector switch

This is used to select the PGM input signals which are to be mixed with the standby INCOM.

13 INCOM PGM level control [PGM]

This is used to select the level of the PGM signals which are to be mixed with the standby INCOM.

14 INCOM selector switch

This is used to select the call party of the standby INCOM.

PRIVATE: For making private calls to the camera.

COMM: For connecting the standby INCOM with the system INCOM.

15 INCOM MIC selector switch [MIC]

ON: The INCOM microphone is set to ON.

OFF: The INCOM microphone is set to OFF.

PTTN: The INCOM microphone is set to ON only while the INCOM MIC selector switch is held down.

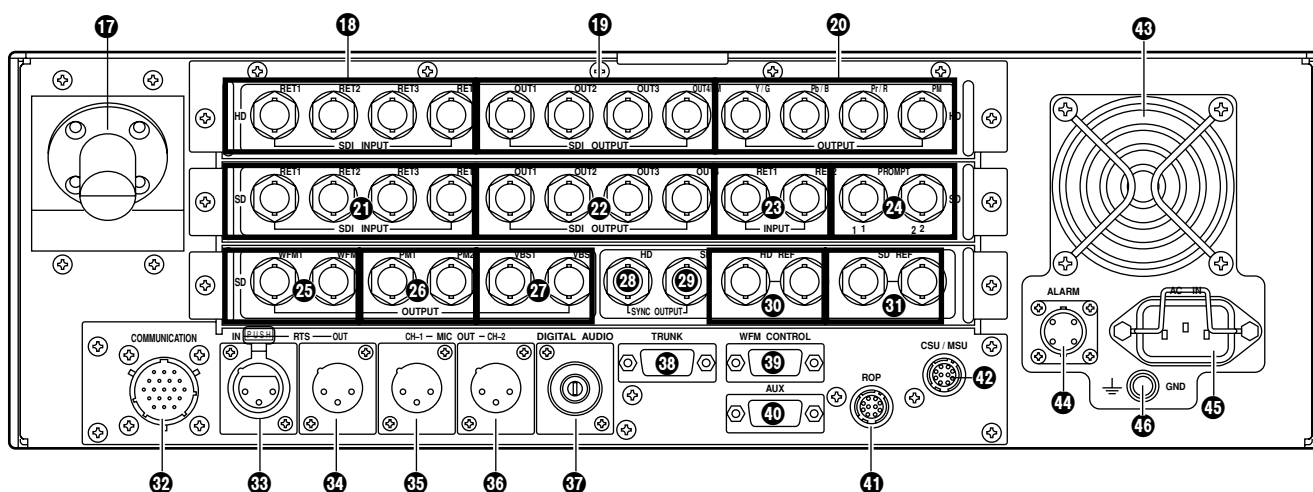
16 Standby INCOM jack

This is connected to INCOM 1 line, and it enables calls to be made to the camera's INCOM 1 line.

Even when the camera power is OFF, calls can still be made to the camera's INCOM 1 line.

Parts and their functions

■ Camera control unit rear panel



17 Optical fiber connector

FXW.3K.93C.CLM made by LEMO

Pin No.	Function	Polarity	Signal flow	Cable color
1	Optical fiber		CAM→CCU	Yellow (01)
2	Optical fiber		CCU→CAM	Yellow (02)
3	Control wire, hot	+	CAM↔CCU	Black
4	Control wire, cold	—	CAM↔CCU	Red
5	AC 240 V live	+	CCU→CAM	Orange
6	AC 240 V neutral	—	CCU→CAM	White

18 HDTV digital return video 1, 2, 3, 4 input connectors [HD DIGITAL RET 1, 2, 3, 4] (Option)

These connectors (BNC) are for inputting the return video signals of the HDTV serial digital interface.

19 HDTV digital video 1, 2, 3, 4 output connectors [HD DIGITAL OUT 1, 2, 3, 4] (Option)

These connectors (BNC) are for outputting the video signals of the HDTV serial digital interface.

20 HDTV analog component video output connectors [HDTV ANALOG Y/G, Pb/B, Pr/R] (Option)

The HDTV analog signals of the camera are output from these connectors (BNC).

G/B/R or Y/Pb/Pr video signals can be selected by the master setup unit (MSU) or remote operation panel (ROP).

SDTV PM output connector [PM]

This is the HDTV PM output (1Vp-p) connector.

21 SDTV digital return video 1, 2, 3, 4 input connectors [SDTV DIGITAL RET 1, 2, 3, 4]

These connectors are for inputting the return video signals of the SDTV serial digital interface.

22 SDTV D1 digital video output connectors [SDTV DIGITAL OUT D1 1, 2, 3]

These connectors are for outputting the D1 format video signals of the SDTV serial digital interface.

There are 3 connectors (BNC).

23 Analog return video 1, 2 input connectors [ANALOG RET 1, 2]

These connectors (BNC) are for inputting the SD analog return video signals.

24 PROMPT-IN connectors [PROMPT1,2]

These are the prompter signal input connectors (BNC).

Input SDTV composite video signals as the prompter signals.

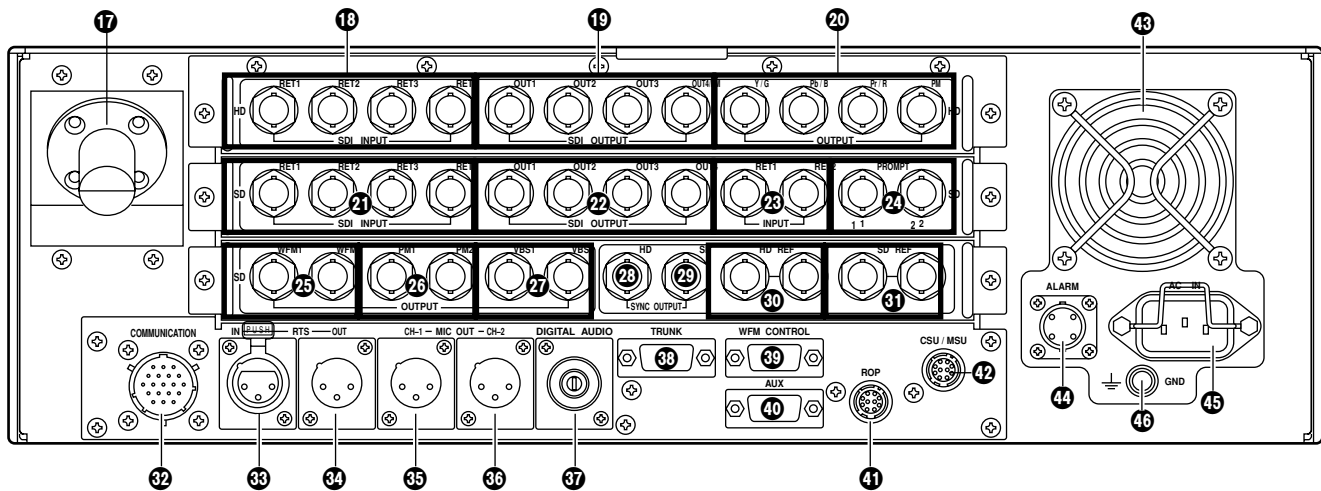
25 SDTV waveform monitor output connectors [SDTV WFM 1, 2]

These connectors (BNC) are for outputting the camera video signals which are to be displayed on the SDTV waveform monitor.

ROP/MSU monitor selection	SDTV WFM output
R	R
G	G
B	B
SEQ	RGB 3 waveforms
ENC	Composite video

Parts and their functions

■ Camera control unit rear panel



②⑥ SDTV picture monitor video output connectors [PM 1, 2]

These connectors (BNC) are for outputting the video signals which are to be displayed on the SDTV picture monitor.

ROP/MSU monitor selection	SDTV PM1 output
R	R+alarm display
G	G+alarm display
B	B+alarm display
SEQ	Y and skin tone zebra pattern
ENC	Composite video

②⑦ SDTV analog composite video output connectors [SDTV VBS]

These connectors (BNC) are for outputting the SDTV analog composite video signals (with sync) of the camera.

②⑧ HDTV analog SYNC output connector [HD SYNC]

The HDTV analog sync signal of the camera is output from this connector (BNC). Its amplitude is ± 0.3 V (75 Ω termination).

②⑨ SDTV analog SYNC output connector [SDTV ANALOG SYNC]

The SDTV analog sync signal of the camera is output from this connector (BNC). Its amplitude is 2 Vp-p (75 Ω termination).

③⑩ HDTV genlock input connectors [HD REF]

These are the HDTV genlock input connectors (BNC). The bridging connection between the two connectors enables one to be used for input purposes and the other for output purposes.

Input the HDTV tri-level sync signal as the genlock signal.

③⑪ SDTV genlock input connectors [SDTV REF]

These are the SDTV genlock input connectors (BNC). The bridging connection between the two connectors enables one to be used for input purposes and the other for output purposes.

Input the BB video signal as the genlock signal.

③⑫ INCOM/tally connector [COMMUNICATION]

The external INCOM or tally system is connected here. INCOM/tally connector (JR25RK-24P made by Hirose)

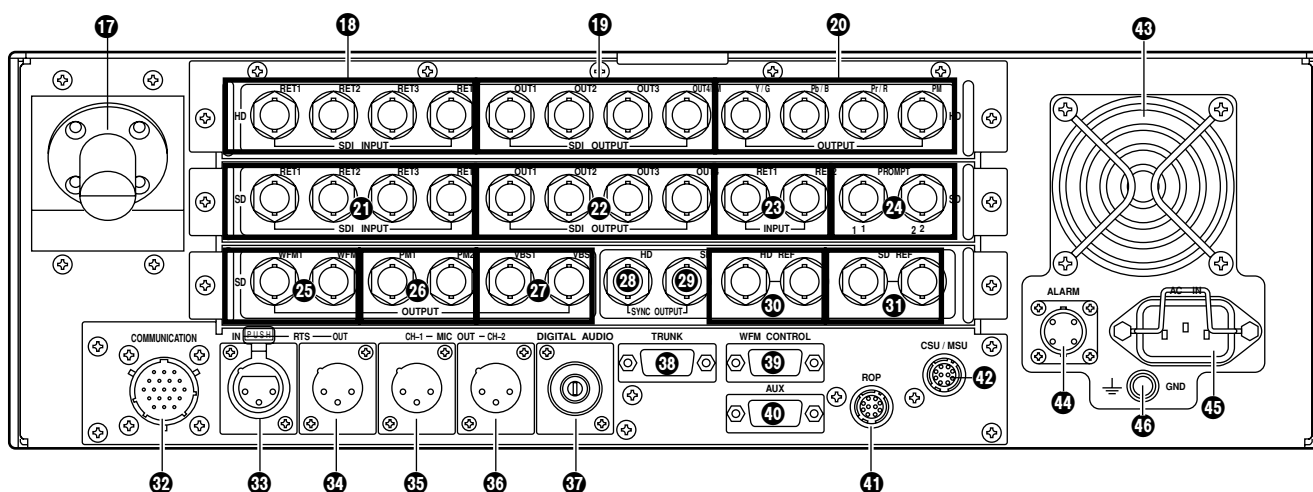
Pin No.	Function	Polarity	Signal flow
1	INCOM 1	+	CCU→SYSTEM
2	INCOM 1	—	CCU→SYSTEM
3	INCOM 1	+	SYSTEM→CCU
4	INCOM 1	—	SYSTEM→CCU
5	NC		
6	INCOM1 (Shield)		CCU→SYSTEM
7	NC		
8	INCOM1 (Shield)		SYSTEM→CCU
9	INCOM2 (Shield)		CCU→SYSTEM
10	Red tally		Contact
11	Tally common		
12	Green tally		Contact
13	NC		
14	INCOM 2	+	CCU→SYSTEM
15	INCOM 2	—	CCU→SYSTEM
16	PGM2(H)	+	SYSTEM→CCU
17	PGM2(C)	—	SYSTEM→CCU
18	PGM1(Shield)		SYSTEM→CCU
19	INCOM 2	+	SYSTEM→CCU
20	INCOM 2	—	SYSTEM→CCU
21	PGM2(Shield)		SYSTEM→CCU
22	PGM1(H)	+	SYSTEM→CCU
23	PGM1(C)	—	SYSTEM→CCU
24	INCOM2 (Shield)		SYSTEM→CCU

PGM output level: 0 dBm/600 Ω

INCOM level: 0 dBm/600 Ω

Parts and their functions

■ Camera control unit rear panel



33 RTS input connector [RTS IN]

The RTS system is connected to this connector.

The microphone level is $-4 \text{ dBm}/200\Omega$.

RTS input connector (HA16PRK-3S made by Hirose)

Pin No.	Function	Polarity	Signal flow
1	Common		
2	Channel 1 (+DC)		
3	Channel 2		

34 RTS output connector [RTS OUT]

The unit is connected to the RTS system from this connector.

The microphone level is $-4 \text{ dBm}/200\Omega$.

RTS output connector (HA16RD-3P made by Hirose)

Pin No.	Function	Polarity	Signal flow
1	Common		
2	Channel 1 (+DC)		
3	Channel 2		

35 36 Mic 1, 2 output connectors [MIC OUT CH-1, CH-2]

These are the microphone 1 analog output connectors of the camera.

The microphone level is $0 \text{ dBm}/600\Omega$.

Mic output connector (HA16RD-3P made by Hirose)

Pin No.	Function	Polarity	Signal flow
1	Shield		
2	Hot	+	CCU→SYSTEM
3	Cold	-	CCU→SYSTEM

17 Digital audio output connector [DIGITAL AUDIO]

This is the camera microphone 1 and 2 output connector (BNC) for AES/EBU digital audio interface specifications.

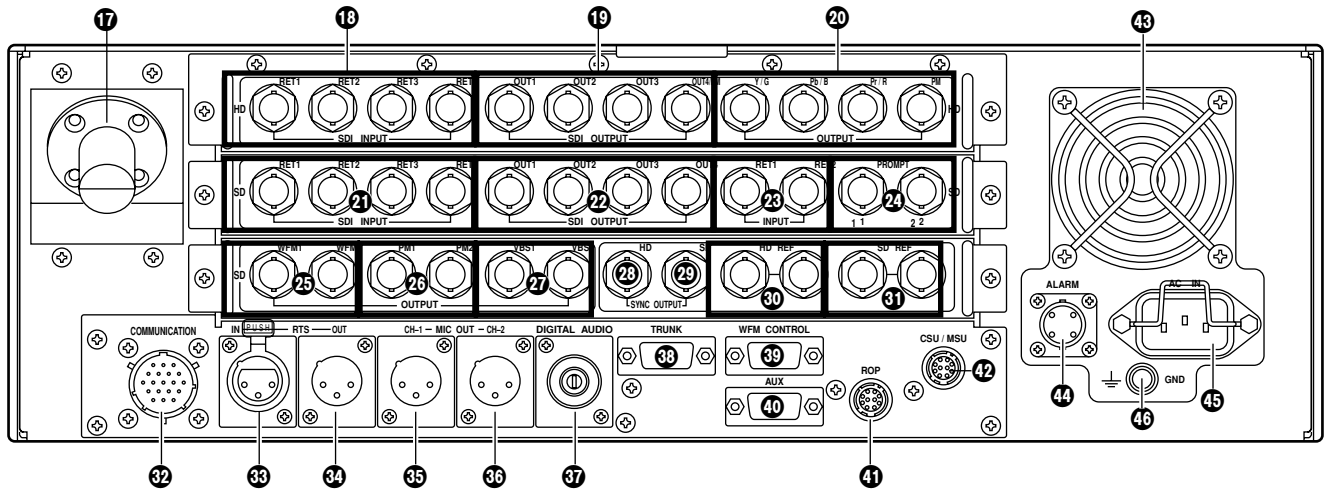
38 TRUNK connector [TRUNK]

This connector enables two sets of RS-422 data to be transmitted.

Pin No.	Function	TRUNK number	Signal flow
1	TX (-)	TRK 2	CAM→CCU 0
2	TX (+)	TRK 3	
3	RX (+)	TRK 0	CCU→CAM 0
4	RX (-)	TRK 1	
5	GND		
6	RTS (-)	TRK 6	CAM→CCU 1
7	RTS (+)	TRK 7	
8	CTS (+)	TRK 4	CCU→CAM 1
9	CTS (-)	TRK 5	

Parts and their functions

■ Camera control unit rear panel



39 Waveform monitor control connector [WFM CTL]

This connector is used for controlling the waveform monitor. Since the interface is different, first check the WFM setting on the SYSTEM menu of the ROP or MSU before connecting the waveform monitor. Waveform monitor control connector (SDAB-9S made by Hirose)

Pin No.	Signal	Function used by SDTV	Function used by HDTV
1	STAIRCASE	10 V output/input channel switching	5 V pull-up, 110 k
2	RGB ENABLE	TTL level low when SEQ is selected by monitor selector switch on ROP or MSU, for parade display	TTL level low
3	THREE LINE OR FIELD	Open	TTL level low when ENC.SEQ is selected by monitor selector switch on ROP or MSU
4	N.C.	Not connected	Not connected
5	CH1	Open	TTL level low when G or SEQ is selected by monitor selector switch on ROP or MSU
6	CH2	Open	TTL level low when B or SEQ is selected by monitor selector switch on ROP or MSU
7	CH3	Open	TTL level low when R or SEQ is selected by monitor selector switch on ROP or MSU
8	N.C.	Not connected	Not connected
9	GND	GND	GND

40 AUX connector [AUX]

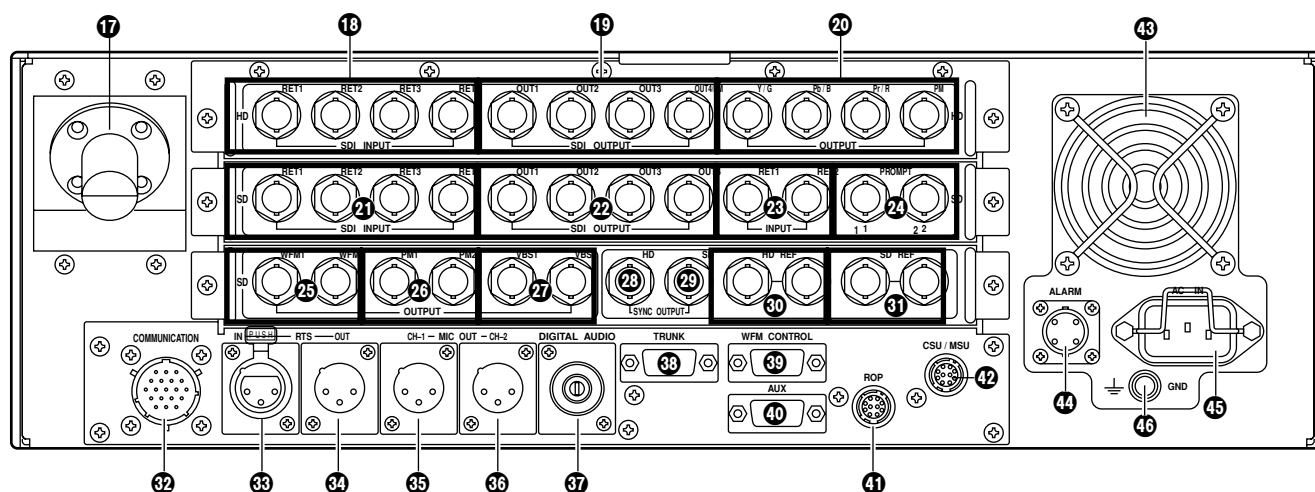
This connector is for establishing the down-converter mode from the external system by remote control. Side panel, squeeze and letter-box are available as the down-converter modes. AUX connector (SDAB-9S made by Hirose)

Pin No.	Signal	Function
1	GND	
2	MODE2	When shorted: 4:3 aspect ratio
3	MODE2	When open: 16:9 aspect ratio
4	MODE1	Refer to table below for the down converter mode.
5	MODE1	
6	N.C.	
7	TALLY R	Contact
8	TALLY G	Contact
9	TALLY COM	

Down-converter mode	MODE1	MODE2
LOCAL	OPEN	OPEN
Letter-box (LB)	MAKE	OPEN
Squeeze (SQ)	OPEN	MAKE
Side panel (SP)	MAKE	MAKE

Parts and their functions

■ Camera control unit rear panel



⑪ ROP connector

The remote operation panel (ROP) is connected to this connector.

ROP connector (HR10A-10R-10S)

Pin No.	Function	Polarity	Signal flow
1	ROP CONT (H)	+	CCU→ROP
2	ROP CONT (C)	—	CCU→ROP
3	ROP DATA (H)	+	ROP→CCU
4	ROP DATA (C)	—	ROP→CCU
5	POW REM/CD A		CCU→ROP
6	INCOMT/CD B		CCU→ROP
7	INCOMR/CD C		CCU→ROP
8	INCOMG/CD D		CCU→ROP
9	+12V	+	CCU→ROP
10	GND		

⑫ CSU/MSN connector

The camera selector unit (CSU) is connected to this connector.

CSU connector (HR10A-10R-10S made by Hirose)

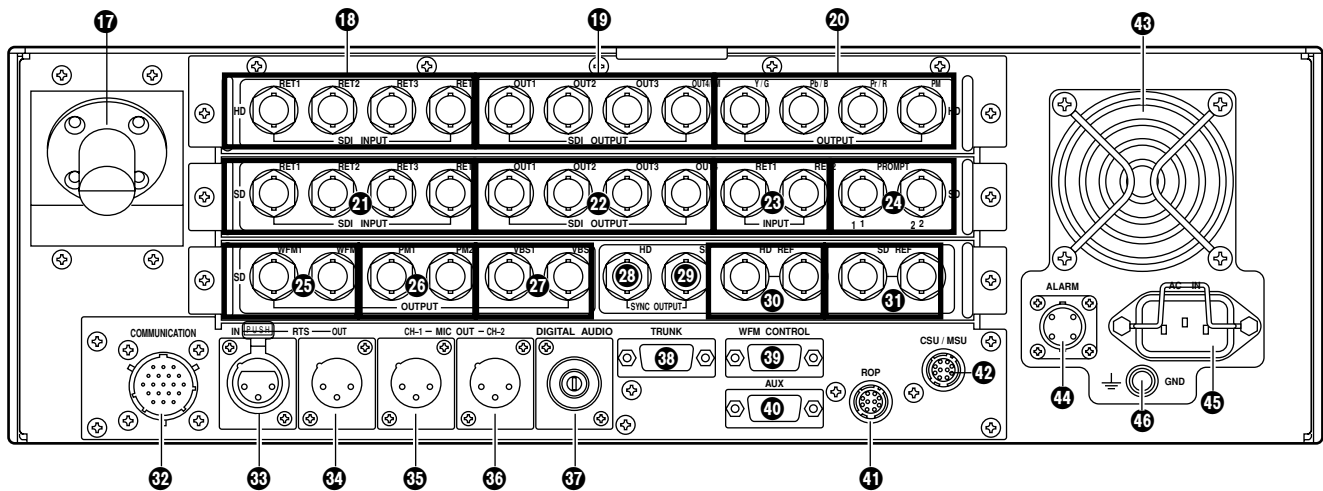
Pin No.	Function	Polarity	Signal flow
1	CSU CONT (H)	+	CCU→CSU
2	CSU CONT (C)	—	CCU→CSU
3	CSU DATA (H)	+	CSU→CCU
4	CSU DATA (C)	—	CSU→CCU
5	TALLY R		CCU→CSU
6	TALLY G		CCU→CSU
7	HEAD POWER		CCU→CSU
8	ALARM 1		CCU→CSU
9	ALARM 0		CCU→CSU
10	GND		

⑬ Fan

This dissipates the heat generated inside the CCU to keep the unit cool.

Parts and their functions

■ Camera control unit rear panel



44 Alarm connector [ALARM]

This connector is for outputting the alarm signals to the external system when any problem with the supply voltage has occurred inside the CCU or the CCU fan has stopped.

When the power supplied to the AC fan or DC fan inside the CCU has been shut down, pins 3 and 4 of this connector are shorted.

If power is supplied to the CCU and any of the DC power supplies inside the CCU fails to output the supply voltage, it means that pins 1 and 2 of this connector are shorted.

Alarm connector (RM-12BRB-4PH made by Hirose)

45 AC inlet [AC IN]

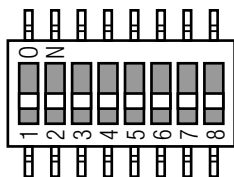
AC 120 V, 50/60 Hz

46 Ground terminal [GND]

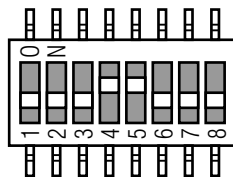
Pin No.	Function
1	POWER ALARM (H)
2	POWER ALARM (L)
3	FAN ALARM (H)
4	FAN ALARM (L)

■ How to switch between 1080i camera mode and 720p camera mode

1. Turn off the power of CCU.
2. Turn the knobs and remove the front panel.
3. Switch the SW281 (MODE SW) on the Control board as follows:



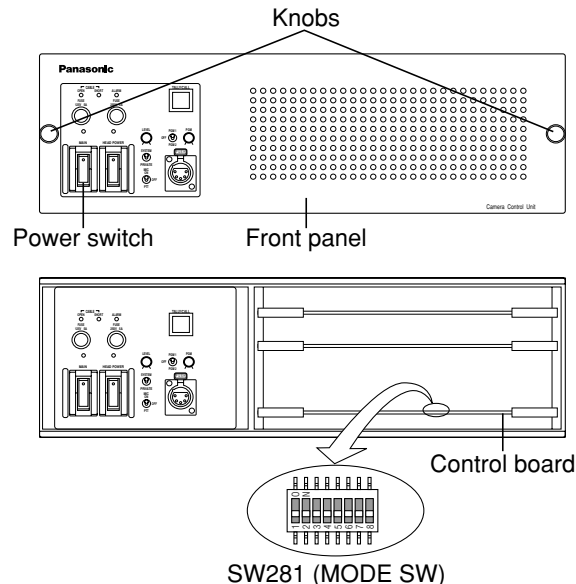
720p camera



1080i camera

- The factory setting is "720p camera".

4. Install the front panel, and turn on the power to complete setting.



Connections

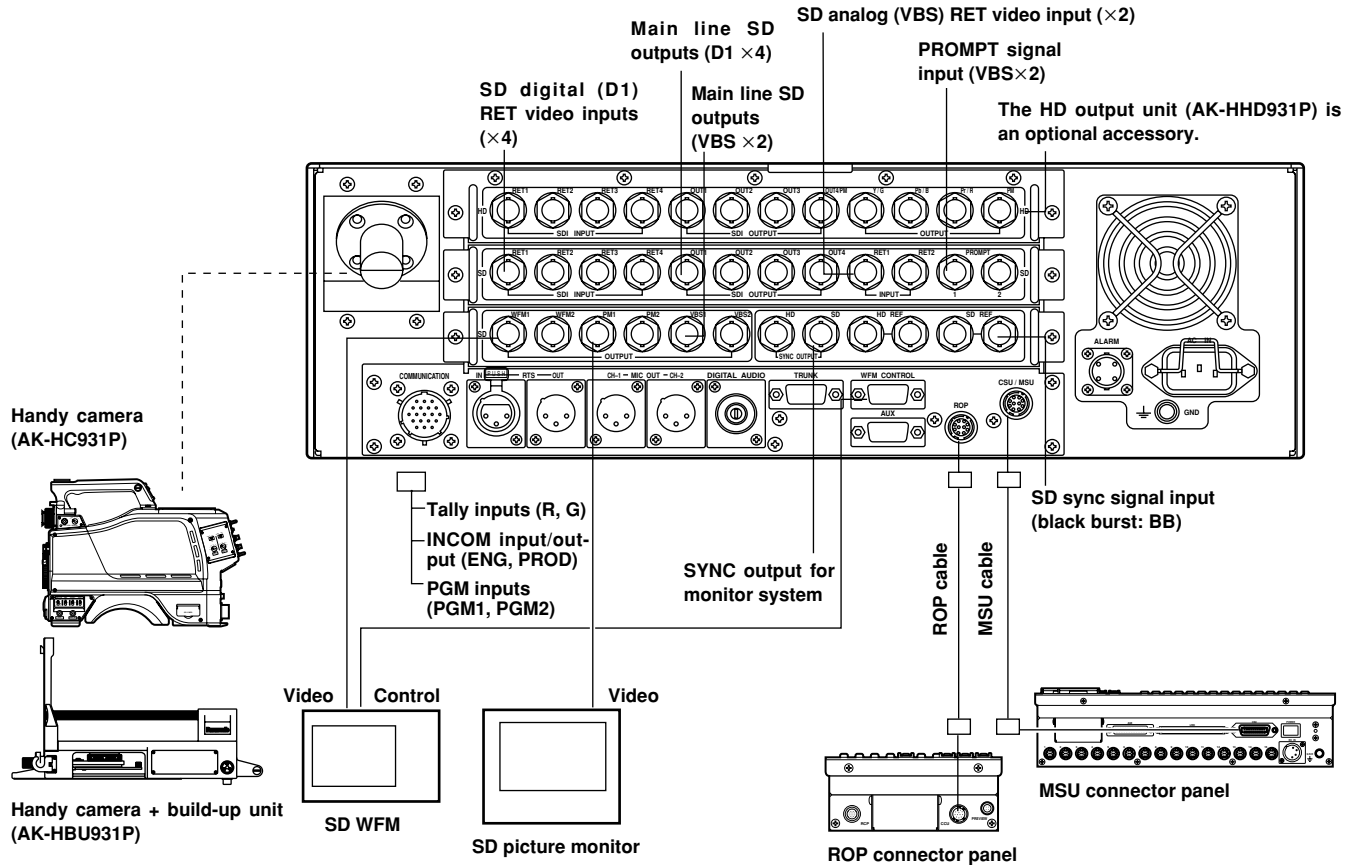
Connections for SD system

Dedicated ROP cables (available as optional accessories) are used to connect the CCU connector on the ROP unit and the ROP connector on the rear panel of the CCU (this unit).

After all the equipment has been connected, set the main power switch on the CCU to ON. Then turn on the camera's power.

<Notes>

- When the camera is not connected, the functions that can be controlled by the ROP and MSU are limited to the CCU control items.
- The camera power of the CCU must be turned off without fail before disconnecting the camera or ROP.



Connections

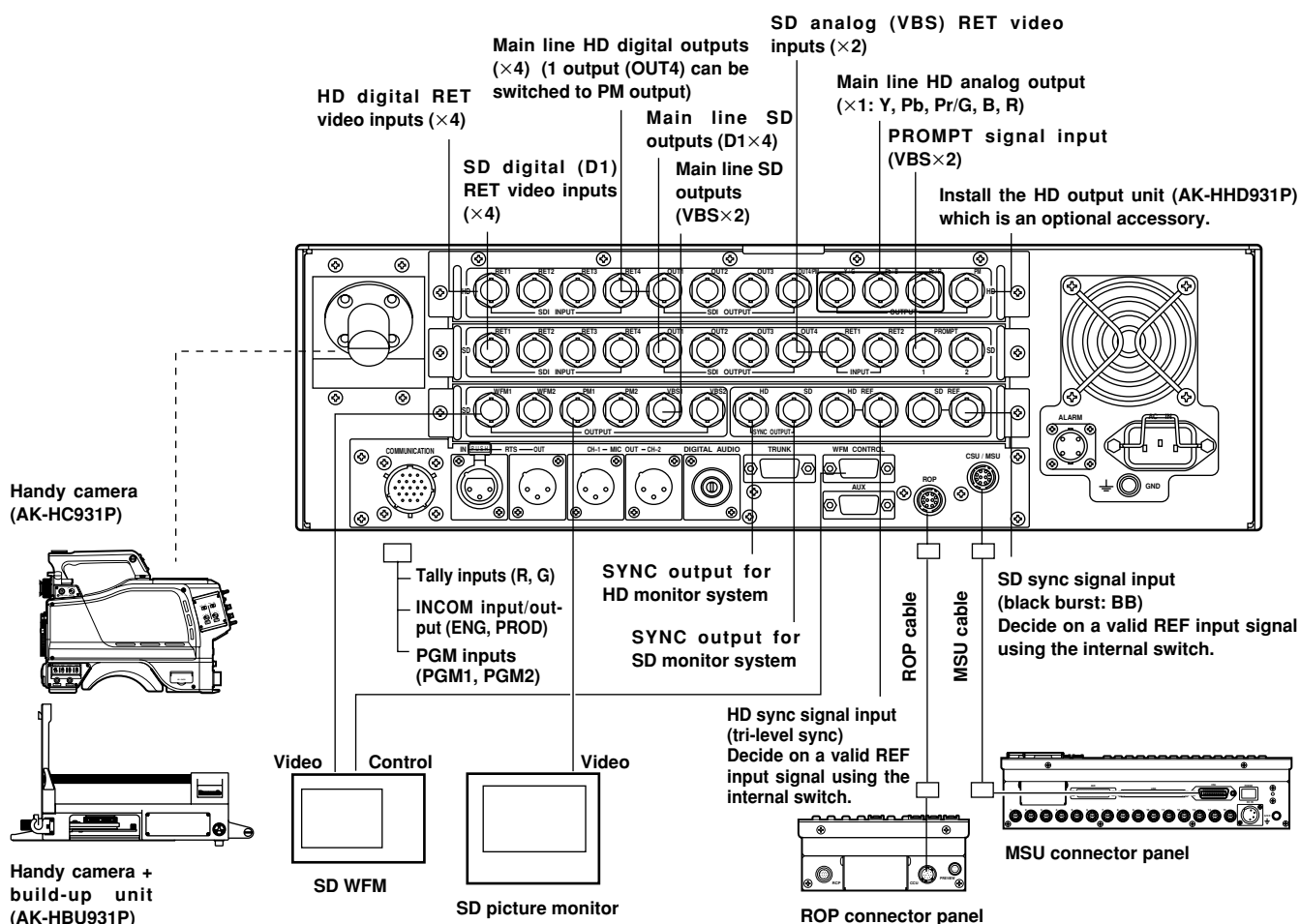
Connections for HD/SD system

Dedicated ROP cables (available as optional accessories) are used to connect the CCU connector on the ROP unit and the ROP connector on the rear panel of the CCU (this unit).

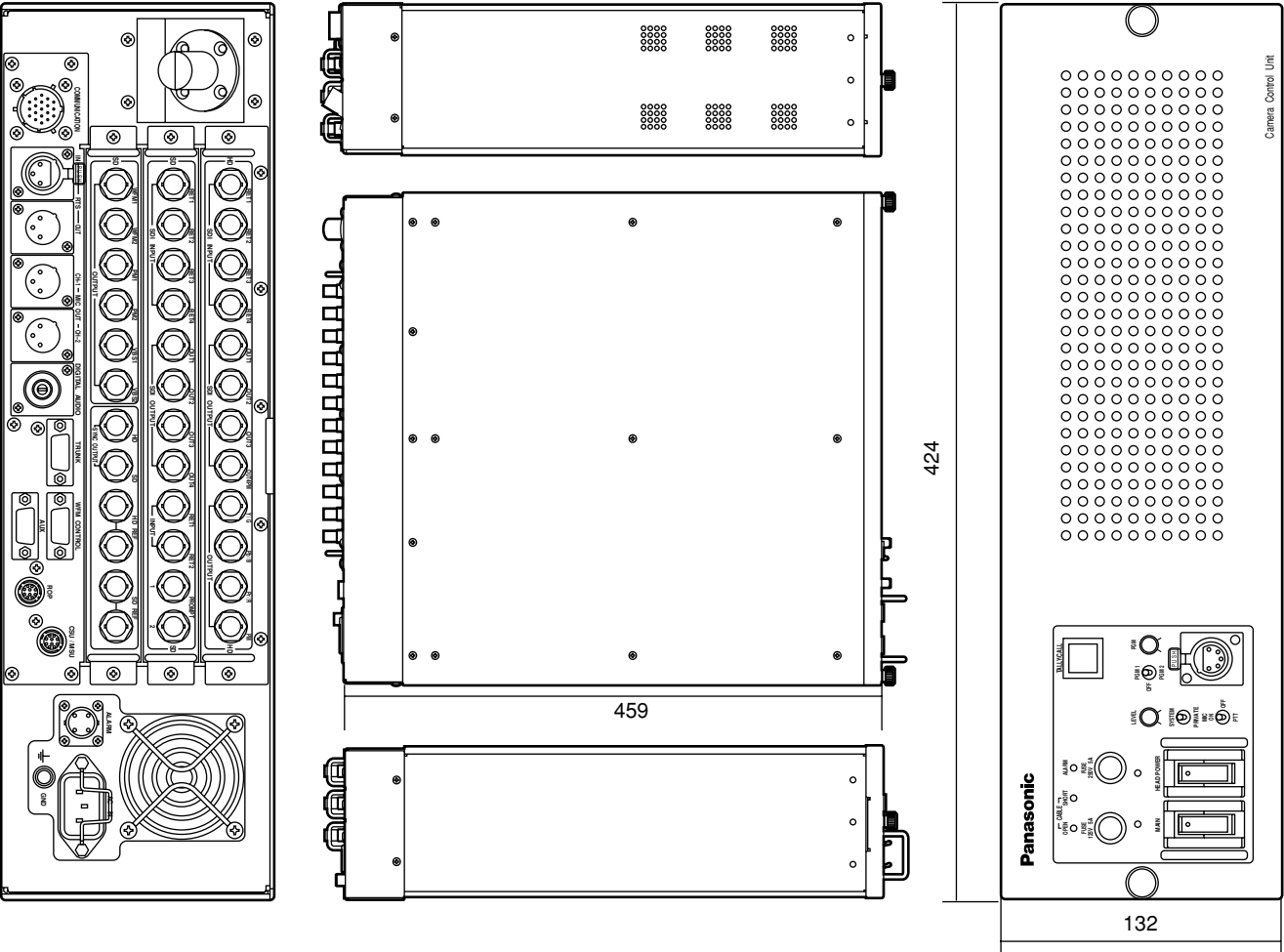
After all the equipment has been connected, set the main power switch on the CCU to ON. Then turn on the camera's power.

<Notes>

- When the camera is not connected, the functions that can be controlled by the ROP and MSU are limited to the CCU control items.
- The camera power of the CCU must be turned off without fail before disconnecting the camera or ROP.
- To configure the HD system, the HD output unit (AK-HHD931P), available as an optional accessory, must be installed.




External dimension drawing



Specifications

Power supply:	AC 120 V
Power consumption:	80 W (when unit is operated on its own)

 indicates safety information.

Video input/output signals

- SD digital signal (D1)
- SD analog signal (VBS)
- HD digital signal (optional)
- HD analog signal (Y, Pb, Pr/GBR): Output only (optional)
- PROMPT signal (VBS): Input only

Sync input signals

- HD reference signal (tri-level sync)
- SD reference signal (BB) (Select one of these signals using the internal switch.)

Audio output signals

- Analog audio output (MIC 1, 2)
- Digital audio output (MIC 1, 2)

Switch functions

Refer to “Parts and their functions” (page 4).

Operating temperature range

0 to +40 °C (+32 to 104 °F)

Storage temperature range

–20 to +60 °C (–4 to 140 °F)

Operating ambient humidity

Less than 85%

Weight

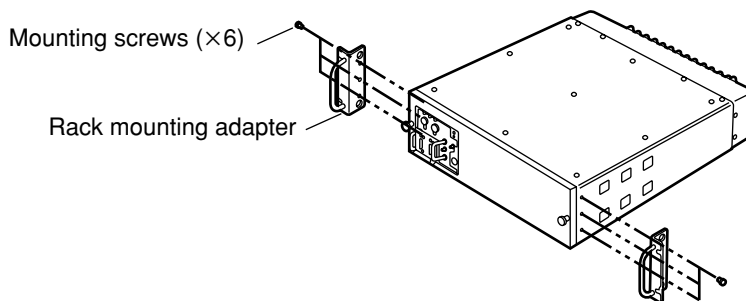
Approx. 20.0 kg (44 lbs)

Dimensions (W×H×D)

420×132×459 mm (excluding protrusions)
(16-9/16×5-1/4×16-9/16 inches)

Rack mounting

Attach the rack mounting adapter firmly by using a crosshead screwdriver as follows:





PANASONIC BROADCAST & TELEVISION SYSTEMS COMPANY
UNIT COMPANY OF PANASONIC CORPORATION OF NORTH AMERICA

Executive Office:

One Panasonic Way 4E-7, Secaucus, NJ 07094 (201) 348-7000

EASTERN ZONE:

One Panasonic Way 4E-7, Secaucus, NJ 07094 (201) 348-7621

Southeast Region:

1225 Northbrook Parkway, Ste 1-160, Suwanee, GA 30024 (770) 338-6835

Central Region:

1707 N Randall Road E1-C-1, Elgin, IL 60123 (847) 468-5200

WESTERN ZONE:

3330 Cahuenga Blvd W., Los Angeles, CA 90068 (323) 436-3500

Government Marketing Department:

52 West Gude Drive, Rockville, MD 20850 (301) 738-3840

Broadcast PARTS INFORMATION & ORDERING:

9:00 a.m. – 5:00 p.m. (PST) (800) 334-4881/24 Hr. Fax (800) 334-4880

Emergency after hour parts orders (800) 334-4881

TECHNICAL SUPPORT:

Emergency 24 Hour Service (800) 222-0741

Panasonic Canada Inc.

5770 Ambler Drive, Mississauga, Ontario L4W 2T3 (905) 624-5010

Panasonic de Mexico S.A. de C.V.

Av angel Urraza Num. 1209 Col. de Valle 03100 Mexico, D.F. (52) 1 951 2127

Panasonic Puerto Rico Inc.

San Gabriel Industrial Park, 65th Infantry Ave., Km. 9.5, Carolina, Puerto Rico 00630 (787) 750-4300

© 2006 Matsushita Electric Industrial Co., Ltd. All rights reserved.